RISK RATING FOR THE GYPSY MOTH IN VIRGINIA

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INTRODUCTION

The gypsy moth, Lymantria dispar, is a spring hardwood defoliator. In the northeastern U.S., gypsy moth larvae finish feeding by late June. Trees that are defoliated are able to put forth a new complement of leaves; however, refoliation can be costly. Producing a second flush of leaves further depletes the already lowered energy reserves of the tree. In addition, the leaves are smaller and less capable of producing and accumulating starch reserves for the following year's growth (Wargo, 1981).

The gypsy moth is now established in the northern tier counties of Virginia. The intent of this report is to identify forested lands in Virginia which are most susceptible to the initial defoliation by the gypsy moth as it moves into an uninfested area. In this report, susceptible forest refers to those stands which are most attractive to the gypsy moth as it enters a previously uninfested area. Susceptible stands are those which are likely to be defoliated first. Resistant forest stands are those stands which are less likely to be defoliated during the initial attack of the gypsy moth. However, these stands have the potential to be attacked later as the infestation spreads. Historically, populations have increased in susceptible stands, whereas they do not normally increase in resistant stands. Therefore, susceptible stands may serve as focal points for outbreaks (Valentine and Houston, 1981). For this reason, information on susceptible forest land can be beneficial to those involved with regional management planning where the potential effect of the gypsy moth is under consideration.

Definition of Susceptibility

The characteristics associated with stands susceptible and resistant to gypsy moth defoliation have been identified through investigations of infested stands in the Northeast (Houston and Valentine, 1977). Susceptible and resistant stands were characterized by comparing conditions in stands having various degrees of defoliation. Particular species complexes and site conditions were found which favor population increase and subsequent severe defoliation. Gypsy moths attack stands which have a favorable species composition for food and protection. Population increase is also dependent on a lack of natural mortality factors--predators, parasitoids, and diseases. When natural enemies are lacking, the gypsy moth population is able to increase unchecked.

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Houston and Valentine (1977) have shown that forest stands with a large white oak component, growing on dry sites with shallow and/or rocky soils, are more susceptible to defoliation than forests on mesic slopes or bottomland sites. There are several reasons for this. White oak is the preferred host species due to its nutritional value, but equally important is the presence of rough, scaly bark which provides many protective niches for the various life stages of the gypsy moth. Therefore, forest stands containing a large portion of white oak are highly favorable for the gypsy moth. The second factor contributing to stand susceptibility is related to site conditions. Trees growing on marginal sites (dry ridges, sandy soils, steep slopes, etc.) exhibit slower growth than the same species on a good site. Slow-growing trees tend to have more crooks and looser bark, which provide protective niches for the gypsy moth. A susceptible site does not provide favorable hiding places for parasitoids and predators. For instance, if there is a scarcity of litter and debris, then beneficial insect and rodent populations will be low or absent.

METHODS

The Renewable Resources Evaluation (RRE) project at the Southeastern Forest Experiment Station collects stand information throughout each state in the Southeast on a periodic basis. Virginia was last surveyed in 1977. A Forest Information Retrieval (FIR) system was used to select the most susceptible portion of the commercial forest land. The FIR system is a customized data retrieval service offered by RRE for compiling numerous forest statistics for any geographic area of interest. The system also offers the user the flexibility of selecting any combination of stand conditions as screening criteria. Stands which do not meet the specified conditions are excluded from the final data compilations. This feature of the FIR system was used to identify those stands most susceptible to defoliation.

Screening criteria were selected which reflected susceptible forest conditions, and these were applied to the 1977 RRE data for the state of Virginia. The forest types used (oak-hickory, oak-pine, chestnut oak, and southern scrub oak) represent known susceptible species complexes. Site conditions which increase susceptibility to defoliation were represented by stands producing less than 85 cubic feet of wood per acre (site classes 4 and 5), and by physiographic class (high mountain tops and slopes, low mountain tops and slopes, mountain foothills, rolling uplands, bluffs, other xeric sites, and also deep swamps and small drainages). Stand size (sawtimber and poletimber) was also used as a screening criteria. It is felt that the combination of these forest types and site conditions will select stands which are susceptible to gypsy moth defoliation, because the stands will provide food in the preferred host species, and the trees will quite likely have poor growth form, which provides protective niches for the life stages of the gypsy moth.

RESULTS AND DISCUSSION

The state was broken into three regions--coastal plain, piedmont, and mountain--for the analysis. Tables were generated for each region, which present information about the susceptible forest on a county-by-county basis (see Appendix).

Tables 1-3 show acreage of forested land in each county and how the acreage is distributed among the three forest classes--commercial, unproductive, and productive/reserved. The FIR system screened the commercial forest land for susceptibility, and acreage of susceptible commercial forest for each county is presented in Tables 1-3. In some counties, such as Page and Rockingham in the mountain region, there are large areas of forest classified as productive/reserved. Productive/reserved forest land is "forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation." The productive/reserved forests undoubtedly will have some stands which are susceptible to defoliation, but this part of the forest is not included in the screening process. Therefore, some susceptible stands will not be included in the estimated figures for susceptible forest land. The map of Virginia in Figure 1 indicates, on a county-by-county basis, the amount of commercial forest land which is most susceptible to gypsy moth defoliation. Counties which have the greatest proportion (51-75%) of susceptible forest land are shown in green; counties with 26-50 percent susceptible forest are in yellow; and those counties with 0-25 percent susceptible forest are in white. No county had more than 75 percent of the commercial forest rated as susceptible to defoliation.

Comparison of regions shows that approximately one-half of the forested land in the mountain and piedmont regions is susceptible to gypsy moth defoliation; whereas less than one-fourth of the forest is rated as susceptible in the coastal plain (Figure 2). The mountain and piedmont regions have more acres of susceptible forest land than the coastal plain. The mountain region has 2,598,366 acres; the piedmont has 2,797,275 acres; and the coastal plain has 690,168 acres of forest land susceptible to gypsy moth defoliation.

Tables 4-6 show the ownership pattern of susceptible forest land within each county. In general, farmers and miscellaneous private individuals own most of the susceptible forest land. Federal ownership of susceptible forest land is significant only in the mountain region, where approximately 30 percent of the susceptible forest land is in national forests (Figure 3).

The volume of sawtimber and growing stock in the susceptible forests is given in Tables 7-9. Just as the mountain and piedmont regions have more acres of susceptible forest than the coastal plain, they also have a greater volume of susceptible timber (Figures 4 and 5).

Landowners and land managers can place their particular forested acreages in the susceptible or resistant category by comparing their forest characteristics to those mentioned previously in the definition of susceptibility and the screening criteria in the methods section.

SUMMARY

This system has identified the portion of forested land in Virginia which is most susceptible to gypsy moth defoliation, but how does suceptibility to defoliation relate to mortality? It has been shown, that under similar defoliation regimes with no additional environmental stress, there is no difference in the likeliness of mortality occurring in stands rated as susceptible versus resistant. Mortality following defoliation is dependent on a number of

Figure 1.--The portion of commercial forest land which is susceptible to defoliation by the gypsy moth is indicated for each county in Virginia. Green indicates that 51-75% of the commercial forest is susceptible to defoliation. Yellow indicates that 26-50% of the commercial forest is susceptible to defoliation. White indicates that 0-25% of the commercial forest is susceptible to defoliation or that there is no susceptible host type.

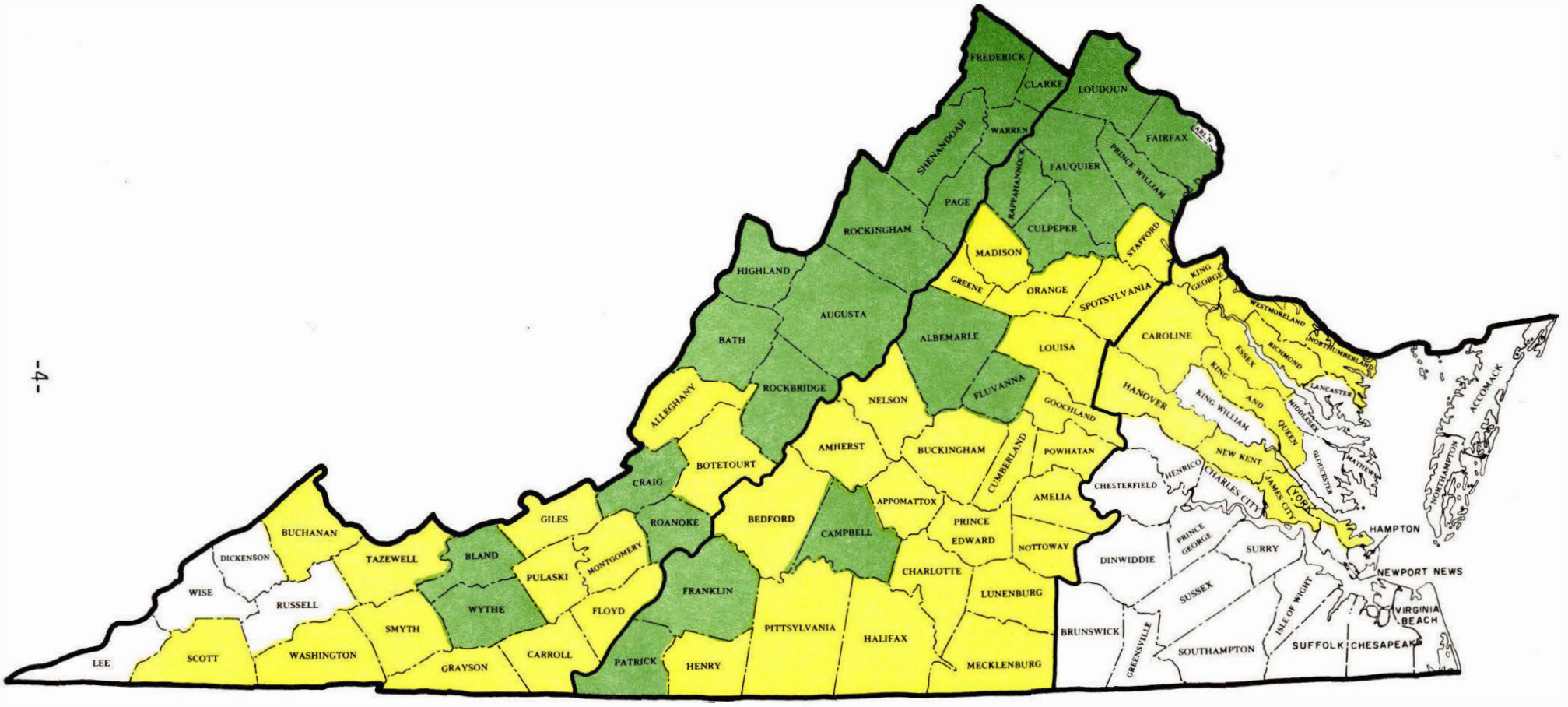
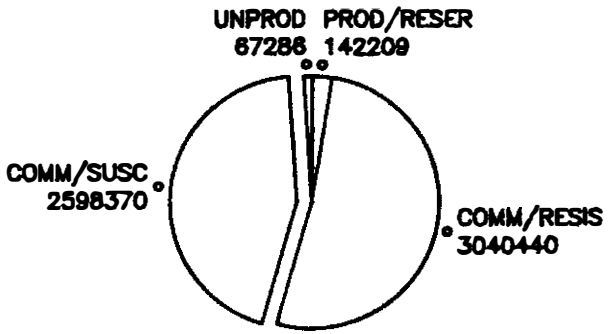
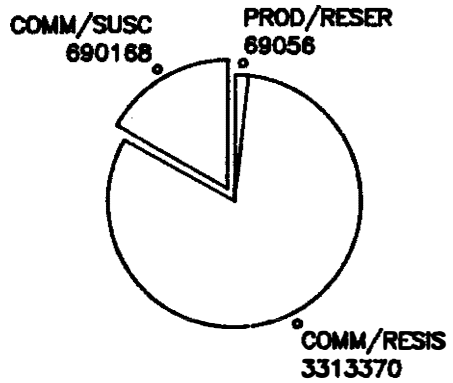


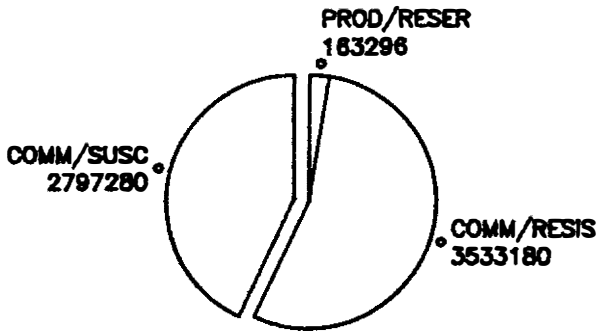
Figure 2. Acres of forested land in Virginia rated as resistant or susceptible to gypsy moth defoliation.



MOUNTAIN REGION



COASTAL PLAIN

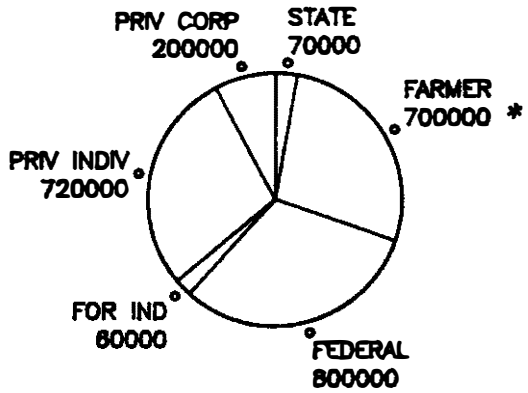


PIEDMONT REGION

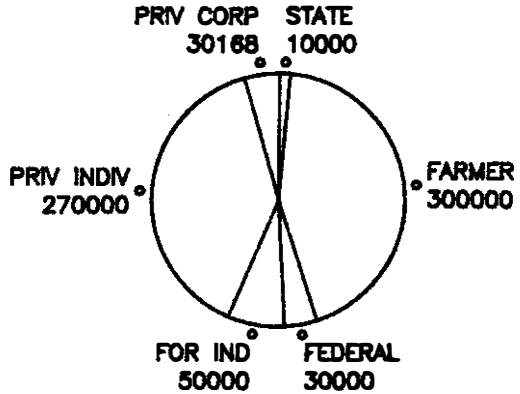
KEY

UNPRODuctive
PRODuctive/RESERved
COMMercial/SUSCeptible
COMMercial/RESIStant

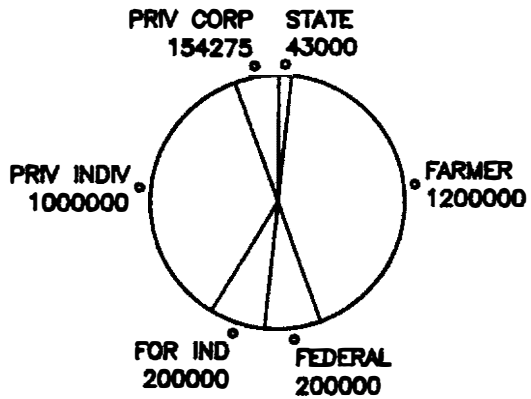
Figure 3. Ownership patterns of forest land in Virginia rated as susceptible to gypsy moth defoliation.



MOUNTAIN REGION



COASTAL PLAIN



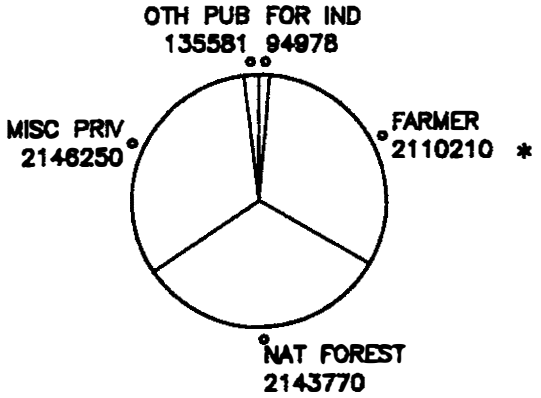
PIEDMONT REGION

KEY

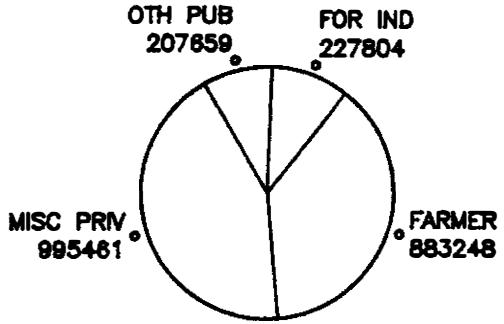
PRIVate CORPoration
PRIVate INDividual
FORest INDustry

* *approximate acreage*

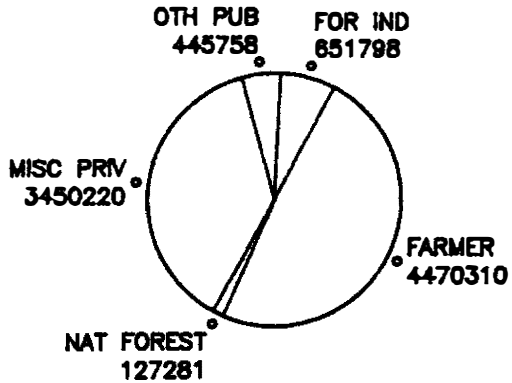
Figure 4. Volumes of hardwood sawtimber, by ownership class, in forests rated as susceptible to gypsy moth defoliation.



MOUNTAIN REGION



COASTAL PLAIN



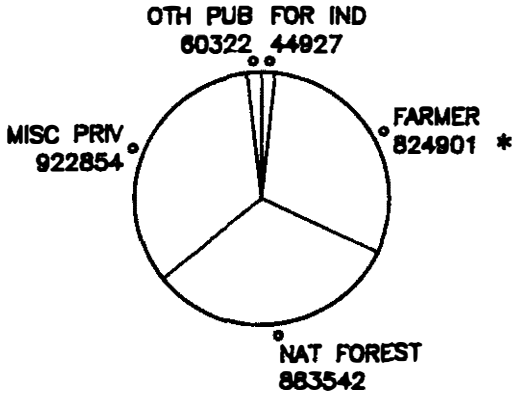
PIEDMONT REGION

KEY

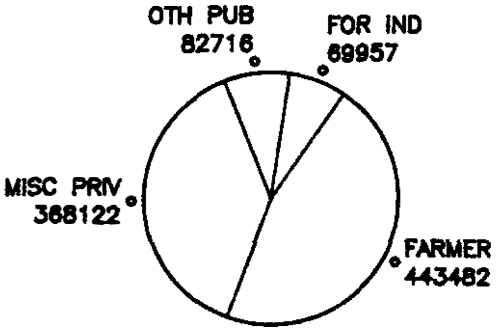
FORest INDustry
NATional FOREST
MISCellaneous PRIVate
OTHer PUBlic lands

** volumes are in thousand board feet*

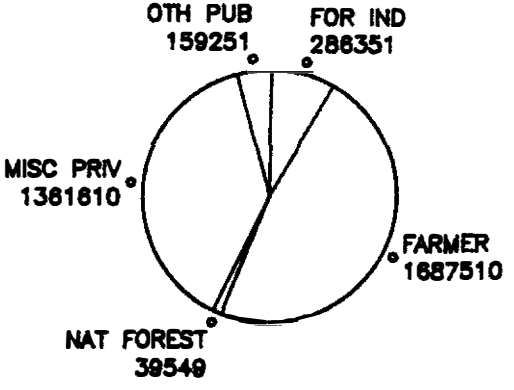
Figure 5. Volumes of hardwood growing stock, by ownership class, in forests rated as susceptible to gypsy moth defoliation.



MOUNTAIN REGION



COASTAL PLAIN



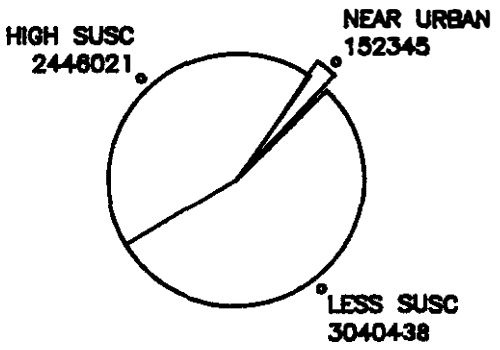
PIEDMONT REGION

KEY

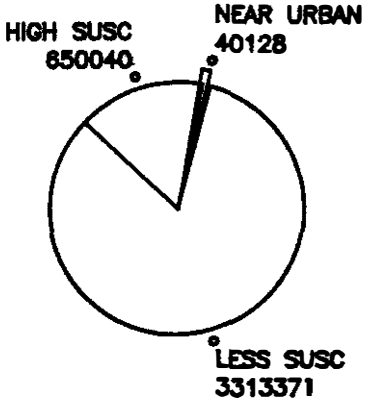
FORest INDustry
NATional FORest
MISCellaneous PRIVate
OTHer PUBlic lands

** volumes are in thousand cubic feet*

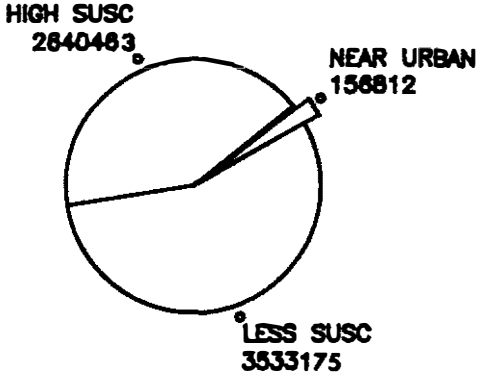
Figure 6. Acres of commercial forest in Virginia rated for sucseptibility to defoliation and proximity to urban buildup and recreation areas.



MOUNTAIN REGION



COASTAL PLAIN



PIEDMONT REGION

KEY

LESS SUSCeptible
HIGHly SUSCeptible
NEAR URBAN and recreation areas and highly susceptible

interacting factors: tree species, condition of the tree prior to defoliation, number and severity of previous defoliations, the occurrence of environmental stress before and/or during defoliation, and the presence of secondary organisms. It appears that mortality occurs when the defoliated trees are already under stress and secondary organisms are present and ready to attack after the gypsy moth (Houston, 1981). In order to estimate mortality, information about these factors must be incorporated into a predictive model. The figures reported here are estimates of expected defoliation by the gypsy moth, and not predictions of mortality. The next step in the risk rating process would be to predict losses to the gypsy moth in individual stands of interest, using a model such as the one developed by Herrick and Gansner (1979).

Definitions of Terms

Commercial forest land.--Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization.

Farm.--Lands on which agriculture operations are being conducted and sale of agriculture products totaled $1,000 or more during the year.

Farm operator.--A person who operates a farm, either doing the work himself or directly supervising the work.

Farm-owned lands.--Lands owned by farm operators.

Forest industry lands.--Lands owned by companies or individuals operating wood-using plants.

Forest land.--Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use.

Forest type.--A classification of forest land based upon the species forming a plurality of live-tree stocking.

Oak-pine.--Forests in which hardwoods (usually upland oaks) comprise a plurality of the stocking, but in which pines comprise 25 to 50 percent of the stocking. (Common associates include gum, hickory, and yellow-poplar.)

Oak-hickory.--Forests in which upland oaks or hickory, singly or in combination, comprise a plurality of the stocking, except where pines comprise 25 to 50 percent, in which case the stand would be classified oak-pine. (Common associates include yellow-poplar, elm, maple, and black walnut.)

Growing-stock trees.--Live trees of commercial species qualifying as desirable or acceptable trees.

Growing-stock volume.--Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem, or to the point where the central stem breaks into limbs. (Net volume in primary forks is included.)

Hardwoods.--Dicotyledonous trees, usually broad-leaved and deciduous.

Soft hardwoods.--Soft-textured hardwoods such as boxelder, red and silver maple, buckeye, hackberry, loblolly-bay, silverbell (in mountains), butternut, sweetgum, yellow-poplar, cucumbertree, magnolia, sweetbay, water tupelo, blackgum, sycamore, cottonwood, black cherry, willow, basswood, and elm.

Hard hardwoods.--Hard-textured hardwoods such as Florida and sugar maple, birch, hickory, dogwood, persimmon (forest-grown), beech, ash, honey-locust, holly, black walnut, mulberry, all commercial oaks, and black locust.

Miscellaneous federal lands.--Federal lands other than national forests, lands administered by the Bureau of Land Management, and Indian lands.

Miscellaneous private lands - corporate.--Lands owned by private corporations other than forest industry.

Miscellaneous private lands - individual.--Privately owned lands other than forest industry, farmer owned, or corporate lands.

National forest land.--Federal lands which have been legally designated as national forests or purchase units and other lands under the administration of the Forest Service, including experimental areas and Bankhead-Jones Title III lands.

Other public lands.--Publicly owned lands other than national forests.

Poletimber trees.--Growing-stock trees of commercial species at least 5.0 inches in d.b.h., but smaller than sawtimber size.

Productive-reserved forest land.--Forest land sufficiently productive to qualify as commercial forest land, but withdrawn from timber utilization through statute or administrative designation.

Sawtimber trees.--Live trees of commercial species containing at least a 12-foot saw log, or two noncontiguous saw logs, each 8 feet or longer, and with at least one-third of the gross board-foot volume between the 1-foot stump and minimum saw-log top being sound. Softwoods must be at least 9.0 inches and hardwoods at least 11.0 inches in diameter at breast height.

Sawtimber volume.--Net volume of the saw-log portion of live sawtimber in board-foot International 1/4-inch rule.

Site class.--A classification of forest land in terms of inherent capacity to grow crops of industrial wood based on fully stocked natural stands.

Class 4.--Sites capable of producing 50 to 85 cubic feet per acre annually.

Class 5.--Sites incapable of producing 50 cubic feet per acre annually, but excluding unproductive sites.

Stand-size class.--A classification of forest land based on the size class of growing-stock trees on the area.

Sawtimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, with one-half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.--Stands at least 16.7 percent stocked with growing-stock trees, of which one-half or more of this stocking is in poletimber and sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

State, county, and minicipal lands.--Lands owned by states, counties, and local public agencies or municipalities, or lands leased to these governmental units for 50 years or more.

Unproductive forest land.--Forest land incapable of producing 20 cubic feet per acre of industrial wood under natural conditions because of adverse site conditions.

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Table 10.--Mountain - Forested land highly susceptible to gypsy moth defoliation and in close proximity to urban buildup or recreation areas.

County	Highly susceptible	Highly susceptible and near urban or recreation areas
	acres	
Alleghany	109,460	6,179
Bath	173,539	4,219
Bland	104,106	5,726
Botetourt	103,878	4,306
Buchanan	69,626	19,909
Carroll	79,139	5,576
Dickinson	37,910	11,176
Page	57,033	4,954
Pulaski	41,197	11,498
Roanoke	63,035	23,843
Rockbridge	130,137	4,860
Rockingham	180,825	302
Russell	39,882	4,969
Scott	111,259	17,043
Smyth	72,943	5,200
Tazewell	66,940	5,502
Washington	51,161	6,073
Wise	52,259	11,010
Totals	1,544,329	152,345

Table 11.--Piedmont - Forested land highly susceptible to gypsy moth defoliation and in close proximity to urban buildup or recreation areas.

County	Highly susceptible	Highly susceptible and near urban or recreation areas
	- - - - - - - - - - - - acres - - - - - - - - - - - -	
Albemarle	165,180	7,684
Amherst	115,800	11,088
Appomattox	72,922	4,778
Bedford	135,158	15,861
Buckingham	137,028	4,081
Campbell	116,246	8,338
Charlotte	78,200	4,193
Culpepper	54,965	3,233
Fairfax	58,961	7,746
Fluvanna	42,355	9,895
Franklin	152,175	3,902
Greene	19,860	3,310
Halifax	110,770	3,712
Henry	41,291	13,317
Loudoun	66,469	12,314
Louisa	116,112	7,136
Madison	47,156	4,272
Mecklenberg	117,977	6,458
Nelson	77,561	3,995
Nottoway	35,021	4,250
Pittsylvania	174,019	3,802
Prince William	57,099	10,170
Stafford	49,156	3,277
Totals	2,041,481	156,812

Table 12.--Coastal Plain - Forested land highly susceptible to gypsy moth defoliation and in close proximity to urban buildup or recreation areas.

County	Highly susceptible	Highly susceptible and near urban or recreation areas
	- - - - - - - - - - - - acres - - - - - - - - - - - -	
Brunswick	54,969	3,075
Caroline	94,784	5,524
Chesterfield	36,596	5,588
Dinwiddie	22,649	1,568
Essex	42,088	3,238
Hanover	84,740	6,100
Henrico	20,224	5,779
James City	31,439	2,106
King George	31,603	2,764
King William	24,566	3,071
York	10,484	1,315
Totals	454,142	40,128

APPENDIX

Table 1.--Mountains - Area of commercial forest land classified as susceptible to defoliation, by county.

County	Acres of Forest Land			Acres of Commercial Forest		Acres Classified as Susceptible to Defoliation		% of Forest Type Susceptible to Defoliation		
	Commercial	Unproductive	Productive/ reserved	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	% of Commercial Forest Susceptible to Defoliation
Alleghany	251,237	3,927	347	183,831	31,852	96,113	13,347	52	42	44
Augusta	318,822	19,115	14,443	239,353	51,405	154,035	25,515	64	50	56
Bath	296,962	8,066	4,065	262,723	21,420	165,100	8,439	63	39	58
Bland	173,604	394	200	147,436	15,703	88,403	15,703	60	100	60
Botetourt	244,440	5,598	1,802	186,892	22,268	90,544	13,334	48	60	42
Buchanan	271,192	-	23	241,326	9,955	69,626	-	29	-	27
Carroll	185,854	-	1,082	103,565	32,103	58,189	20,950	56	65	43
Clarke	34,291	-	95	34,291	-	19,760	-	58	-	58
Craig	175,219	13	2,393	119,560	18,674	87,065	4,487	73	24	52
Dickenson	176,529	-	2,461	143,002	-	37,910	-	27	-	21
Floyd	136,861	-	1,857	67,889	31,333	47,000	15,666	69	50	46
Frederick	143,151	796	108	115,620	13,767	83,504	9,179	72	67	65
Giles	170,265	-	660	143,474	4,465	62,099	-	43	-	36
Grayson	155,892	-	4,592	115,986	8,137	57,994	8,137	50	100	42
Highland	195,717	677	-	156,552	29,691	104,403	16,842	67	57	62
Lee	159,989	315	7,258	133,222	16,172	26,490	10,874	20	67	23
Montgomery	149,584	183	-	99,571	26,369	31,014	15,821	31	60	31
Page	85,840	3,473	37,553	60,598	10,838	49,796	7,237	82	67	66
Pulaski	116,113	-	-	81,610	17,248	23,949	17,248	29	100	35
Roanoke	114,165	-	583	71,850	11,922	57,074	5,961	79	50	55
Rockbridge	249,091	2,541	5,703	184,629	37,591	110,694	19,443	60	52	52
Rockingham	249,963	13,089	39,742	208,060	23,170	157,655	23,170	76	100	72
Russell	159,563	-	-	139,688	-	39,882	-	29	-	25
Scott	230,360	122	425	218,998	-	111,259	-	51	-	48
Shenandoah	185,560	7,872	-	133,930	22,096	100,834	22,096	75	100	66
Smyth	173,650	90	3,207	142,605	14,819	63,324	9,619	44	65	42
Tazewell	204,713	-	-	193,711	-	66,940	-	35	-	33
Warren	71,254	894	13,186	44,173	5,416	38,757	5,416	88	100	62
Washington	189,973	-	164	165,681	18,219	32,942	18,219	20	100	27
Wise	210,513	121	-	188,493	5,505	52,259	-	28	-	25
Wythe	148,437	-	260	125,147	12,600	96,340	10,709	77	85	72

Table 2.--Piedmont - Area of commercial forest land classified as susceptible to defoliation, by county.

County	Acres of Forest Land			Acres of Commercial Forest		Acres Classified as Susceptible to Defoliation		% of Forest Type Susceptible to Defoliation		% of Commercial Forest Susceptible to Defoliation
	Commercial	Unproductive	Productive/ reserved	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	
Albemarle	291,386	-	29,270	195,916	23,052	149,812	15,368	76	23	57
Amelia	170,791	-	129	87,798	7,988	62,933	-	72	0	37
Amherst	232,994	-	1,868	157,014	32,628	90,632	25,168	58	77	50
Appomattox	154,961	-	600	88,856	7,968	68,388	4,534	77	57	47
Arlington	-	-	-	-	-	-	-	-	-	-
Bedford	292,451	-	5,235	222,392	25,116	124,582	10,576	56	42	46
Buckingham	298,646	-	-	173,763	32,784	124,683	12,345	72	38	46
Campbell	222,295	-	-	145,429	10,647	110,923	5,323	76	50	52
Charlotte	207,387	-	-	77,834	33,707	53,409	24,791	69	74	50
Culpepper	107,768	-	-	62,504	16,166	42,032	12,933	67	80	51
Cumberland	132,352	-	-	71,417	10,849	44,474	3,849	62	35	37
Fairfax	105,435	-	17,616	82,198	3,873	58,961	-	72	-	56
Fauquier	191,790	-	-	134,476	15,317	103,394	7,658	77	50	58
Fluvanna	134,086	-	-	58,661	24,737	27,514	14,841	47	60	52
Franklin	294,675	-	1,193	183,391	57,181	128,764	23,411	70	41	52
Goochland	136,607	-	-	72,041	19,099	37,665	15,279	52	80	39
Greene	51,983	-	14,787	34,100	3,310	19,860	-	58	-	38
Halifax	336,266	-	622	135,188	44,540	84,789	25,981	63	58	33
Henry	170,457	-	1,377	61,432	33,892	27,973	13,318	46	39	24
Loudoun	111,614	-	112	90,035	5,162	61,307	5,162	68	1	60
Louisa	234,104	-	-	152,696	16,282	111,539	4,573	73	28	50
Lunenburg	211,760	-	-	105,756	21,633	66,145	9,123	63	42	36
Madison	97,685	-	32,174	72,059	8,542	42,885	4,271	60	5	48
Mecklenberg	246,513	-	2,656	158,992	19,066	111,807	6,170	70	32	48
Nelson	238,094	-	1,338	174,425	23,186	62,103	15,458	36	67	33
Nottoway	137,206	-	-	47,771	14,795	26,521	8,500	56	57	26
Orange	131,845	-	489	78,193	24,888	42,653	10,662	55	43	40
Patrick	220,037	-	6,227	163,778	38,496	92,962	25,678	57	67	54
Pittsylvania	392,910	-	-	205,239	53,235	135,995	38,024	66	71	44
Powhatan	126,358	-	-	77,689	7,171	54,676	2,834	70	40	46
Prince Edward	163,327	-	-	78,769	16,418	61,979	4,198	79	26	41
Prince William	104,606	-	10,516	73,463	3,390	53,709	3,390	73	1	55
Rappahannock	74,756	-	31,739	64,562	3,398	47,572	3,398	74	1	68
Spotsylvania	184,139	-	3,393	80,085	35,829	50,900	7,762	64	21	32
Stafford	123,166	-	1,955	83,938	12,538	45,879	3,277	55	26	40

Table 3.--Coastal Plain - Area of commercial forest land classified as susceptible to defoliation, by county.

County	Acres of Forest Land			Acres of Commercial Forest		Acres Classified as Susceptible to Defoliation		% of Forest Type Susceptible to Defoliation		
	Commercial	Unproductive	Productive/ reserved	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	Oak/Hickory Type	Oak/Pine Type	% of Commercial Forest Susceptible to Defoliation
Accomack	114,092	2,123	908	45,088	24,302	-	-	-	-	-
Brunswick	290,505	-	-	125,323	58,046	36,522	18,447	29	32	19
Caroline	263,294	-	-	93,661	50,229	64,963	29,821	69	59	36
Charles City	87,509	-	230	26,802	28,089	-	9,596	-	34	11
Chesapeake	113,784	-	16,661	6,211	14,456	-	-	-	-	-
Chesterfield	211,294	-	4,825	99,101	39,739	24,653	11,943	25	30	17
Dinwiddie	246,146	-	687	82,893	57,258	19,637	3,012	24	5	9
Essex	107,164	-	-	48,562	16,116	35,612	6,476	73	40	39
Gloucester	96,044	-	-	41,808	14,083	10,036	-	24	-	10
Greensville	138,074	-	-	41,059	21,678	2,671	-	7	-	2
Hampton	6,523	-	-	-	-	-	-	-	-	-
Hanover	198,593	-	219	89,454	31,886	62,004	22,736	69	71	43
Henrico	71,760	-	359	43,336	8,668	17,334	2,890	40	33	28
Isle of Wight	123,178	-	-	42,334	22,434	851	-	2	-	1
James City	62,651	-	3,802	29,548	18,837	23,904	7,535	81	40	50
King & Queen	160,961	-	-	50,910	37,408	18,924	25,084	37	67	27
King George	69,762	-	2,429	50,950	11,055	28,839	2,764	57	25	45
King William	125,112	-	-	46,063	18,426	24,566	-	53	-	20
Lancaster	51,686	-	-	22,134	11,067	5,533	5,534	25	50	21
Mathews	34,106	-	-	8,459	2,820	-	-	-	-	-
Middlesex	53,831	-	-	23,873	18,371	6,821	6,820	29	37	25
New Kent	101,407	-	-	42,245	20,528	24,238	9,090	57	44	33
Newport News	15,442	-	223	2,331	-	-	-	-	-	-
Northampton	31,586	616	-	7,995	7,857	-	-	-	-	-
Northumberland	69,188	-	-	48,123	2,408	21,053	2,408	44	1	34
Prince George	119,660	-	984	60,875	2,440	-	-	-	-	-
Richmond	79,027	-	-	40,270	3,204	24,975	-	62	-	32
Southampton	263,927	-	-	85,749	34,088	-	3,427	-	10	1
Suffolk	134,912	-	28,543	47,265	36,434	-	-	-	-	-
Surry	133,958	-	987	48,552	29,492	8,534	-	18	-	6
Sussex	248,554	-	-	70,785	53,170	8,867	2,945	13	6	5
Virginia Beach	57,598	-	3,180	12,482	6,422	-	-	-	-	-
Westmoreland	86,931	-	1,565	49,614	10,994	35,870	2,794	72	25	44
York	35,280	-	3,462	20,883	-	10,484	-	50	-	30

Table 4.--Mountains - Acres of commercial forest land classified as susceptible to defoliation, by ownership and county.

County	All Ownerships	National Forest	Misc. Federal	State	County and Municipal	Forest Industry	Farmer	Misc. Pri. Corporate	Misc. Pri. Individual
Alleghany	109,460	76,978	1,030	450	258	4,094	-	4,442	22,208
Augusta	179,550	100,234	-	8,104	100	-	21,880	5,470	43,762
Bath	173,539	100,761	-	9,486	-	-	25,316	16,876	21,100
Bland	104,106	47,379	-	-	500	10,417	34,358	-	11,452
Botetourt	103,878	33,054	-	-	6,327	4,212	21,530	17,224	21,531
Buchanan	69,626	-	-	-	-	14,873	4,978	19,911	29,864
Carroll	79,139	2,426	-	-	-	4,222	44,611	5,576	22,304
Clarke	19,760	-	-	-	-	758	9,501	-	9,501
Craig	91,552	67,300	-	-	-	-	14,551	-	9,701
Dickenson	37,910	4,384	-	-	-	-	5,588	16,763	11,175
Floyd	62,666	-	-	-	-	-	36,555	5,222	20,889
Frederick	92,683	4,994	-	3	-	513	41,293	9,176	36,704
Giles	62,099	26,377	-	-	-	-	17,862	-	17,860
Grayson	66,131	5,194	-	-	-	-	44,317	5,540	11,080
Highland	121,245	34,769	-	3,376	241	5,939	51,280	5,128	20,512
Lee	37,364	-	-	-	-	279	15,893	-	21,192
Montgomery	46,835	17,837	1,185	1,445	-	-	5,273	-	21,095
Page	57,033	24,594	-	-	35	-	14,402	-	18,002
Pulaski	41,197	3,890	-	210	-	2,602	5,749	11,499	17,247
Roanoke	63,035	-	-	1,402	5,880	8,066	5,961	5,961	35,765
Rockbridge	130,137	21,067	-	11,586	5,754	4,237	34,027	-	53,466
Rockingham	180,825	96,501	-	227	75	-	24,712	14,827	44,483
Russell	39,882	-	-	-	-	130	14,907	9,938	14,907
Scott	111,259	8,423	-	-	200	381	73,850	5,681	22,724
Shenandoah	122,930	43,987	-	-	190	-	14,766	4,922	59,065
Smyth	72,943	16,482	-	4,419	37	-	31,203	-	20,802
Tazewell	66,940	-	-	4,171	-	2,250	22,007	22,007	16,505
Warren	44,173	4,591	1,575	93	-	-	27,081	10,833	-
Washington	51,161	6,094	-	2,554	-	-	6,074	-	36,439
Wise	52,259	15,030	4,200	-	-	-	5,505	11,009	16,515
Wythe	107,049	42,909	-	-	-	-	42,760	5,345	16,035
All counties	2,598,366	805,255	7,990	47,526	19,597	62,973	717,790	213,350	723,885

Table 5.--Piedmont - Acres of commercial forest land classified as susceptible to defoliation, by ownership and county.

County	All Ownerships	National Forest	Misc. Federal	State	County and Municipal	Forest Industry	Farmer	Misc. Pri. Corporate	Misc. Pri. Individual
Albemarle	165,180	-	-	763	3,052	-	80,683	7,684	72,998
Amelia	62,933	-	-	-	-	7,012	35,950	-	19,971
Amherst	115,800	21,771	-	-	-	11,968	26,110	-	55,951
Appomattox	72,922	-	-	4,698	80	13,734	22,672	4,534	27,204
Arlington	-	-	-	-	-	-	-	-	-
Bedford	135,158	18,141	-	40	1,968	15,876	55,516	11,896	31,721
Buckingham	137,028	-	-	6,186	-	28,806	48,980	8,163	44,893
Campbell	116,246	-	-	-	219	15,971	58,366	12,507	29,183
Charlotte	78,200	-	-	-	-	15,311	46,118	4,193	12,578
Culpepper	54,965	-	-	-	-	-	35,565	-	19,400
Cumberland	48,323	-	-	6,304	-	11,228	30,791	-	-
Fairfax	58,961	-	8,975	2,764	748	-	3,873	15,492	27,109
Fauquier	111,052	-	-	-	-	-	61,270	15,318	34,464
Fluvanna	42,355	-	-	-	-	2,776	19,789	-	19,790
Franklin	152,175	-	-	-	-	-	78,038	-	74,137
Goochland	52,944	-	-	-	-	7,107	11,459	3,820	30,558
Greene	19,860	-	-	-	-	-	6,620	3,310	9,930
Halifax	110,770	-	2,554	-	-	11,718	92,787	-	3,711
Henry	41,291	-	-	-	-	-	4,440	1,338	35,513
Loudoun	66,469	-	3,849	4	1,059	-	28,728	4,105	28,729
Louisa	116,112	-	-	33	649	10,250	45,730	13,719	45,731
Lunenburg	75,268	-	-	-	470	17,203	30,492	6,775	20,328
Madison	47,156	-	-	3,547	-	897	21,357	4,271	17,084
Mecklenberg	117,977	-	15,070	579	223	9,725	72,296	-	20,084
Nelson	77,561	2,442	-	-	-	11,202	31,959	15,979	15,979
Nottoway	35,021	-	9,466	-	55	-	21,250	-	4,250
Orange	53,315	-	-	-	-	3,559	28,432	-	21,324
Patrick	118,640	-	-	2,435	-	-	65,847	3,873	46,485
Pittsylvania	174,019	-	-	-	-	18,126	121,675	7,604	26,614
Powhatan	57,510	-	-	2,643	-	2,834	17,344	-	34,689
Prince Edward	66,177	-	-	4,707	-	15,295	33,582	-	12,593
Prince William	57,099	-	6,252	-	-	-	16,950	10,170	23,727
Rappahannock	50,970	-	-	-	-	-	33,980	-	16,990
Spotsylvania	58,662	-	-	-	-	4,331	11,642	3,881	38,808
Stafford	49,156	-	-	-	-	-	19,662	9,382	19,662
All counties	2,797,275	42,354	46,166	34,703	8,518	234,929	1,319,953	168,464	942,188

Table 6.--Coastal Plain - Acres of commercial forest land classified as susceptible to defoliation, by ownership and county.

County	All Ownerships	National Forest	Misc. Federal	State	County and Municipal	Forest Industry	Farmer	Misc. Pri. Corporate	Misc. Pri. Individual
Accomack	-	-	-	-	-	-	-	-	-
Brunswick	54,969	-	-	-	-	11,925	21,521	-	21,523
Caroline	94,784	-	19,160	58	-	3,743	30,387	2,762	38,674
Charles City	9,596	-	-	-	-	3,664	2,966	-	2,966
Chesapeake	-	-	-	-	-	-	-	-	-
Chesterfield	36,596	-	-	4,820	-	-	15,887	3,178	12,711
Dinwiddie	22,649	-	1,568	-	-	-	12,045	-	9,036
Essex	42,088	-	-	-	-	-	22,662	9,713	9,713
Gloucester	10,036	-	-	-	-	-	-	-	10,036
Greensville	2,671	-	-	-	-	-	-	-	2,671
Hampton	-	-	-	-	-	-	-	-	-
Hanover	84,740	-	-	1,211	175	7,105	39,649	6,100	30,500
Henrico	20,224	-	-	-	-	-	2,890	2,889	14,445
Isle of Wight	851	-	-	10	841	-	-	-	-
James City	31,439	-	1,113	993	-	2,962	7,535	7,535	11,301
King & Queen	44,008	-	-	-	-	7,044	18,482	-	18,482
King George	31,603	-	1,125	-	75	-	11,056	-	19,347
King William	24,566	-	-	-	-	-	12,282	-	12,284
Lancaster	11,067	-	-	-	-	-	5,534	-	5,533
Mathews	-	-	-	-	-	-	-	-	-
Middlesex	13,641	-	-	-	-	-	3,411	-	10,230
New Kent	33,328	-	-	-	-	-	9,090	3,030	21,208
Newport News	-	-	-	-	-	-	-	-	-
Northampton	-	-	-	-	-	-	-	-	-
Northumberland	23,461	-	-	-	-	2,408	15,038	-	6,015
Prince George	-	-	-	-	-	-	-	-	-
Richmond	24,975	-	-	11	58	2,481	19,221	-	3,204
Southampton	3,427	-	-	-	-	-	3,427	-	-
Suffolk	-	-	-	-	-	-	-	-	-
Surry	8,534	-	-	-	-	2,650	2,942	-	2,942
Sussex	11,812	-	-	-	-	2,976	8,836	-	-
Virginia Beach	-	-	-	-	-	-	-	-	-
Westmoreland	38,619	-	-	-	136	-	35,734	-	2,749
York	10,484	-	6,540	-	-	-	1,314	1,315	1,315
All counties	690,168	-	29,506	7,103	1,285	46,958	301,909	36,522	266,885

Table 7.--Mountains - Volume of hardwood sawtimber and growing stock on commercial forest land, by county.

County	Thousand Board Feet			Thousand Cubic Feet		
	Total	Susceptible to Defoliation	% Susceptible to Defoliation	Total	Susceptible to Defoliation	% Susceptible to Defoliation
Alleghany	554,401	217,006	39	205,176	91,213	44
Augusta	494,279	386,093	78	222,735	163,689	73
Bath	789,841	442,577	56	307,361	184,063	60
Bland	320,217	167,065	52	141,957	81,644	58
Botetourt	723,116	265,143	37	235,173	97,701	42
Buchanan	683,682	182,330	27	260,626	66,170	25
Carroll	268,566	183,017	68	127,610	90,070	71
Clarke	154,311	79,997	52	48,650	27,969	57
Craig	371,018	224,048	60	152,231	98,425	65
Dickenson	544,147	88,386	16	184,691	30,805	17
Floyd	215,849	190,999	88	76,945	63,802	83
Frederick	435,859	366,033	84	163,970	128,715	78
Giles	578,715	161,886	28	228,823	75,021	33
Grayson	349,515	170,106	49	133,066	69,137	52
Highland	621,495	429,884	69	216,715	152,004	70
Lee	445,090	54,536	12	172,520	30,892	18
Montgomery	345,630	147,056	43	148,421	61,800	42
Page	164,753	151,675	92	66,268	55,809	84
Pulaski	157,240	33,769	21	95,474	29,231	31
Roanoke	151,992	41,761	27	68,494	32,640	48
Rockbridge	764,177	364,033	48	259,622	140,272	54
Rockingham	690,585	458,991	66	241,642	169,593	70
Russell	424,483	97,605	23	154,259	47,217	31
Scott	729,157	379,694	52	258,389	126,078	49
Shenandoah	426,639	321,268	75	191,126	135,866	71
Smyth	639,161	267,387	42	242,431	105,198	43
Tazewell	661,386	177,147	27	260,766	75,372	29
Warren	162,165	88,550	55	73,970	50,913	69
Washington	702,994	113,212	16	266,604	55,301	21
Wise	621,508	132,731	21	243,187	70,889	29
Wythe	401,899	246,800	61	178,219	129,047	72

Table 8.--Piedmont - Volume of hardwood sawtimber and growing stock on commercial forest land, by county.

County	Thousand Board Feet			Thousand Cubic Feet		
	Total	Susceptible to Defoliation	% Susceptible to Defoliation	Total	Susceptible to Defoliation	% Susceptible to Defoliation
Albemarle	917,102	771,226	84	310,018	263,949	85
Amelia	487,208	247,580	51	160,417	95,069	59
Amherst	540,628	298,976	55	203,957	116,081	57
Appomattox	258,478	210,442	81	108,627	86,092	79
Arlington	-	-	-	-	-	-
Bedford	609,131	395,934	65	232,372	138,919	60
Buckingham	488,131	371,378	76	194,921	154,867	79
Campbell	392,122	325,227	83	163,195	135,208	83
Charlotte	388,916	227,770	59	150,429	93,028	62
Culpepper	242,781	213,793	88	92,711	73,323	78
Cumberland	148,338	102,333	69	162,156	45,475	28
Fairfax	620,925	397,086	64	174,551	122,078	70
Fauquier	483,633	369,113	76	175,909	137,737	78
Fluvanna	158,250	89,355	56	74,909	40,682	54
Franklin	575,685	360,366	63	249,262	161,893	65
Goochland	281,553	143,128	65	112,826	63,915	57
Greene	191,762	107,633	56	58,217	34,802	60
Halifax	542,969	313,209	58	179,036	134,027	75
Henry	179,036	80,649	45	75,053	33,981	45
Loudoun	467,738	310,334	66	140,746	95,587	68
Louisa	386,753	278,922	72	190,433	139,019	73
Lunenburg	344,355	206,580	60	146,335	89,124	61
Madison	336,718	189,779	56	109,148	63,882	59
Mecklenberg	457,252	369,042	81	201,117	159,059	79
Nelson	877,904	288,091	33	286,360	97,240	34
Nottoway	226,295	132,605	59	81,658	48,306	59
Orange	317,973	273,589	86	103,201	83,793	81
Patrick	398,812	249,958	63	163,921	104,950	64
Pittsylvania	735,528	458,135	62	301,817	209,452	69
Powhatan	306,971	180,119	59	120,968	77,511	64
Prince Edward	290,023	214,930	74	125,493	91,681	73
Prince William	412,029	319,198	77	133,234	106,098	80
Rappahannock	290,994	211,982	73	85,407	64,670	76
Spotsylvania	287,434	179,509	62	140,906	81,901	58
Stafford	475,494	257,402	54	161,917	91,875	57

Table 9.--Coastal Plain - Volume of hardwood sawtimber and growing stock on commercial forest land, by county.

County	Thousand Board Feet			Thousand Cubic Feet		
	Total	Susceptible to Defoliation	% Susceptible to Defoliation	Total	Susceptible to Defoliation	% Susceptible to Defoliation
Accomack	111,455	-	-	62,640	-	-
Brunswick	306,113	131,611	43	139,095	59,606	43
Caroline	591,311	343,043	58	216,045	128,120	59
Charles City	181,312	27,111	15	65,892	9,573	15
Chesapeake	388,571	-	-	128,688	-	-
Chesterfield	420,084	137,131	33	167,955	52,057	31
Dinwiddie	382,791	44,825	12	169,349	23,562	14
Essex	266,507	130,944	49	96,381	51,433	53
Gloucester	255,093	26,777	10	83,710	10,818	13
Greensville	262,942	14,821	6	99,470	3,642	4
Hampton	24,229	-	-	6,843	-	-
Hanover	415,503	297,019	71	153,946	107,893	70
Henrico	140,089	66,718	48	63,906	27,527	43
Isle of Wight	376,577	-	-	119,013	-	-
James City	206,955	184,735	89	68,841	56,175	82
King & Queen	325,129	159,481	49	122,410	58,127	47
King George	218,942	95,570	44	78,675	34,370	44
King William	238,259	86,075	36	78,159	29,074	37
Lancaster	38,339	6,744	18	19,202	3,207	17
Mathews	58,310	-	-	18,840	-	-
Middlesex	72,376	21,936	30	27,844	7,504	27
New Kent	344,968	127,076	37	101,408	42,660	42
Newport News	48,826	-	-	13,504	-	-
Northampton	24,145	-	-	16,934	-	-
Northumberland	148,548	57,009	38	51,941	22,017	42
Prince George	290,394	-	-	104,274	-	-
Richmond	242,111	91,561	38	74,248	30,315	41
Southampton	743,388	2,536	<1	241,723	1,298	<1
Suffolk	433,422	-	-	138,833	-	-
Surry	322,680	62,600	19	106,401	14,485	14
Sussex	457,451	51,870	11	165,012	15,853	10
Virginia Beach	218,983	-	-	78,864	-	-
Westmoreland	178,577	100,840	56	61,926	37,938	61
York	189,379	46,139	24	54,436	17,804	33

Forest Pest Management
Asheville Field Office

Report #82-1-28
June 1982

RISK RATING FOR THE GYPSY MOTH IN VIRGINIA

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ADDENDUM TO REPORT NO. 82-1-28

In this addendum to Report #82-1-28, "Risk Rating for the Gypsy Moth in Virginia," the portion of susceptible forest located near people is identified. The gypsy moth is a nuisance and annoyance to the public, whether it occurs near homes or in recreation areas. Therefore, the greatest control effort will be directed toward urban and recreation areas once the gypsy moth becomes established in the state.

The Forest Information Retrieval (FIR) system was used to determine the amount of susceptible forest located near urban and recreation areas. Only stands that met all screening criteria for susceptibility and had urban buildup or productive/reserved forest land within a 50-acre circle from the stand's center were selected.

This analysis indicates that only a small portion of the highly susceptible forest is located near urban buildup or recreation areas (Figure 6). These areas are of special interest, because once the state is generally infested, initial allocation of control resources will be directed here. Traditionally, the gypsy moth has been a "people problem." In the Northeast, where eradication is no longer feasible, control projects are politically motivated and/or economically justified only in urban and recreation areas to reduce the nuisance caused by the insect and to protect foliage. The areas we have identified will need primary attention, because gypsy moth populations will probably begin to increase here first. This will result in a heightened public awareness of the problem and similar increase in political pressure to implement control projects. Acreage, by county, of susceptible forest near urban and recreation areas is given in Tables 10, 11, and 12.

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Reply to: 1380 Reports Management (FPM)

Date: March 14, 1983

Subject: Report No. 82-1-28: Risk Rating for the Gypsy Moth in Virginia

To: Staff Director, Forest Pest Management, R-8

Enclosed please find an addendum to Report No. 82-1-28 entitled "Risk Rating for the Gypsy Moth in Virginia." The addendum identifies susceptible forested land which is located near urban and recreation areas. This information was included in the reports on susceptibility to gypsy moth defoliation for North Carolina and South Carolina. It has been added to the Virginia report so that all three reports will contain the same type of information. Please attach the addendum to your copy of Report No. 82-1-28. Thank you.

HAROLD W. FLAKE
Field Representative

Enclosure